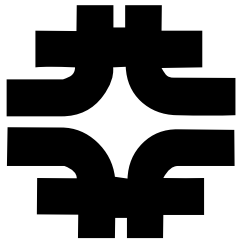


Record Store 2887 : What's different?



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Why did we reach 48.9 e30 on Aug 10 ?

Based on six recent stores, an informal collection of plots showing that

- (i) The instantaneous Luminosity measured at CDF at the beginning of HEP for store 2887 is consistent with expectation. That is, the Hour Glass factor did not change. (No miracle at collisions!)
- (ii) For the three last successful stores, the lifetime efficiencies in the TeV are good. Quite good: the pbar lifetime at 150 GeV for store 2887 averages ~ 10 hours, and for protons, ~ 3.3 hours.

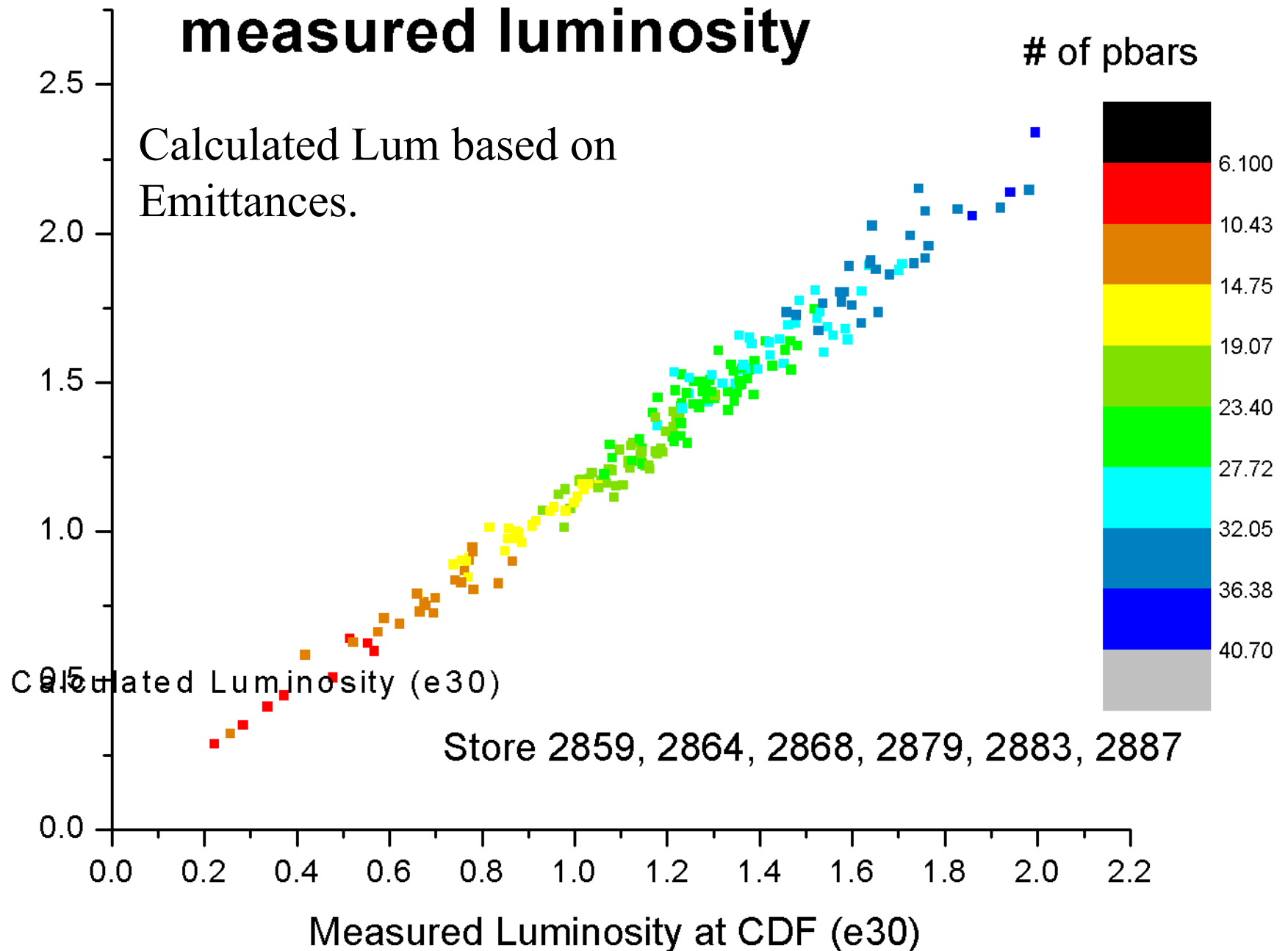
Moreover..

- (i) Store 2887 simply happened to have the largest pbar stack among these three good stores. Hence the record luminosity. We probably also reach a record in terms of the highest pbar bunch intensity at low beta ($\sim 40 \text{ e9}$)
- (ii) The pbar Ramp and Squeeze efficiencies do depend on the emittance, small emittance, large efficiency. (nothing new here, nice confirmation..)
- (iii) The proton intensity for store 2887 was not “too high” (we do not know what the optimum is: if the emittances for pbar or perhaps proton is too large, and the proton current too high, we lose pbars due to beam-beam effect. Knowing exactly where the optimum is a difficult business.
- (iv) Main Injector (not presented here) behaved well.. Good beam in the TeV

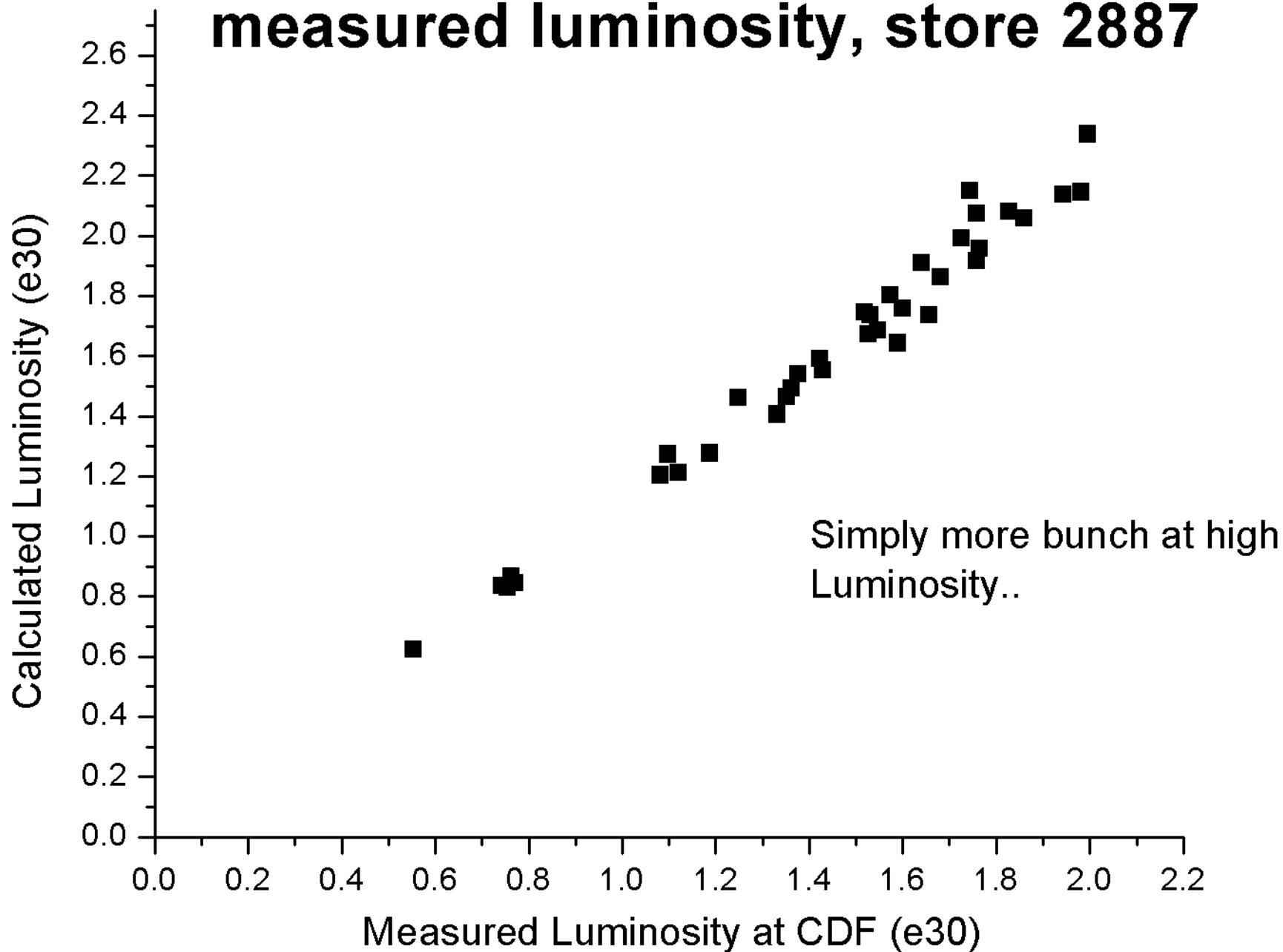
Un-answered questions/suggestions

- (i) Is the TeV dynamical aperture at 150 a bit wider now? Is it just slightly smaller emittance of the pbar bunches (longitudinally ?) that does it? Is it both? Difficult to say, because the systematic error on emittance measurement are still high....
- (ii) Are the pbar injection energy errors and related orbit motion in the Tev smaller now than before?
- (iii) Optimum number of protons: is the highest proton current always the best, regardless of the proton emittance ? Guess so, not proven..
- (iv) May be the “aggressive” orbit smoothing from Tan is actually starting to pay off, and we do have a bigger dynamical aperture given the tighter control on the orbits...
- (v) Yet, the new helix up the ramp should help, given how tight we are in terms of effective dynamical aperture, and the established correlation with proton intensity.

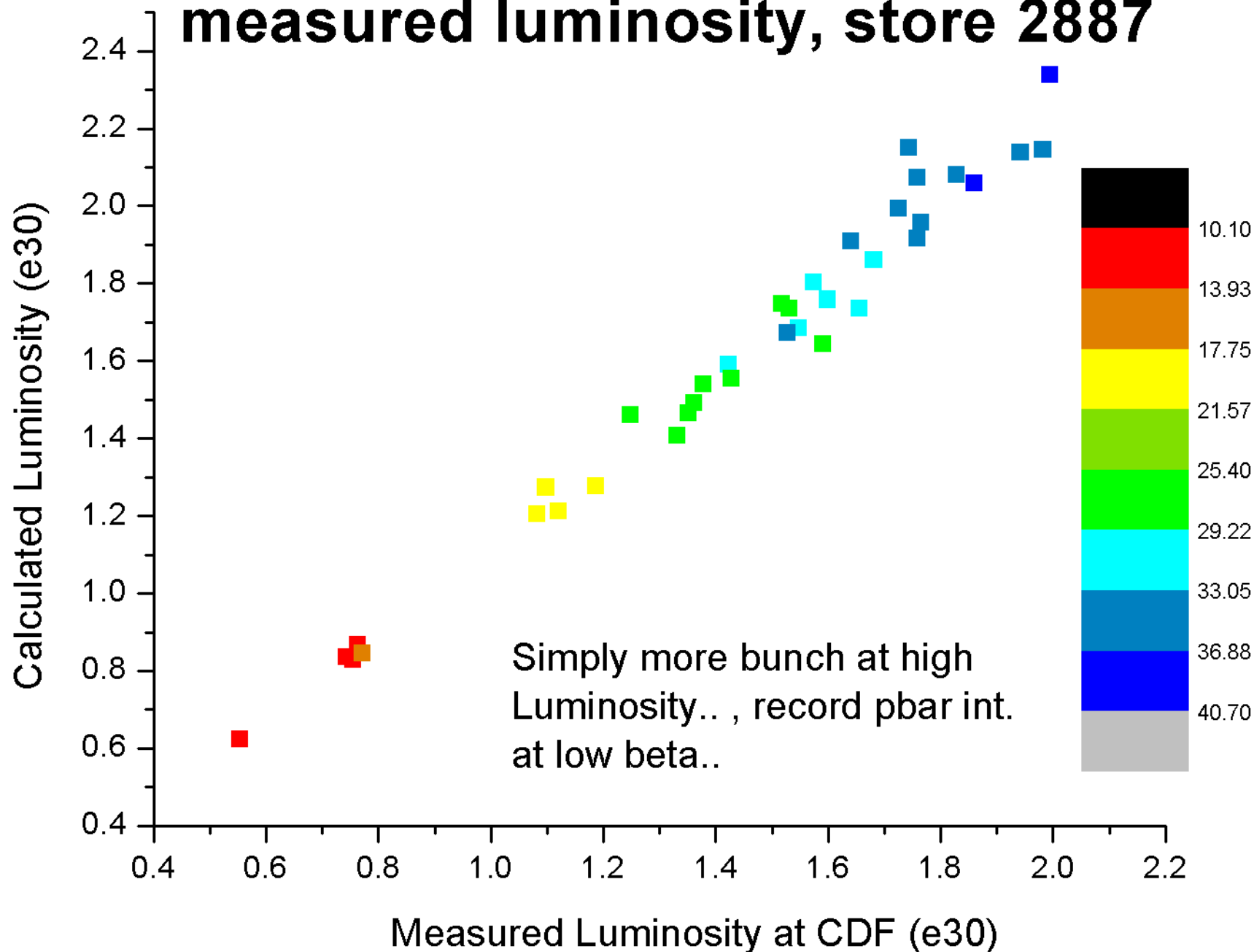
Recent comparison calculated vs measured luminosity



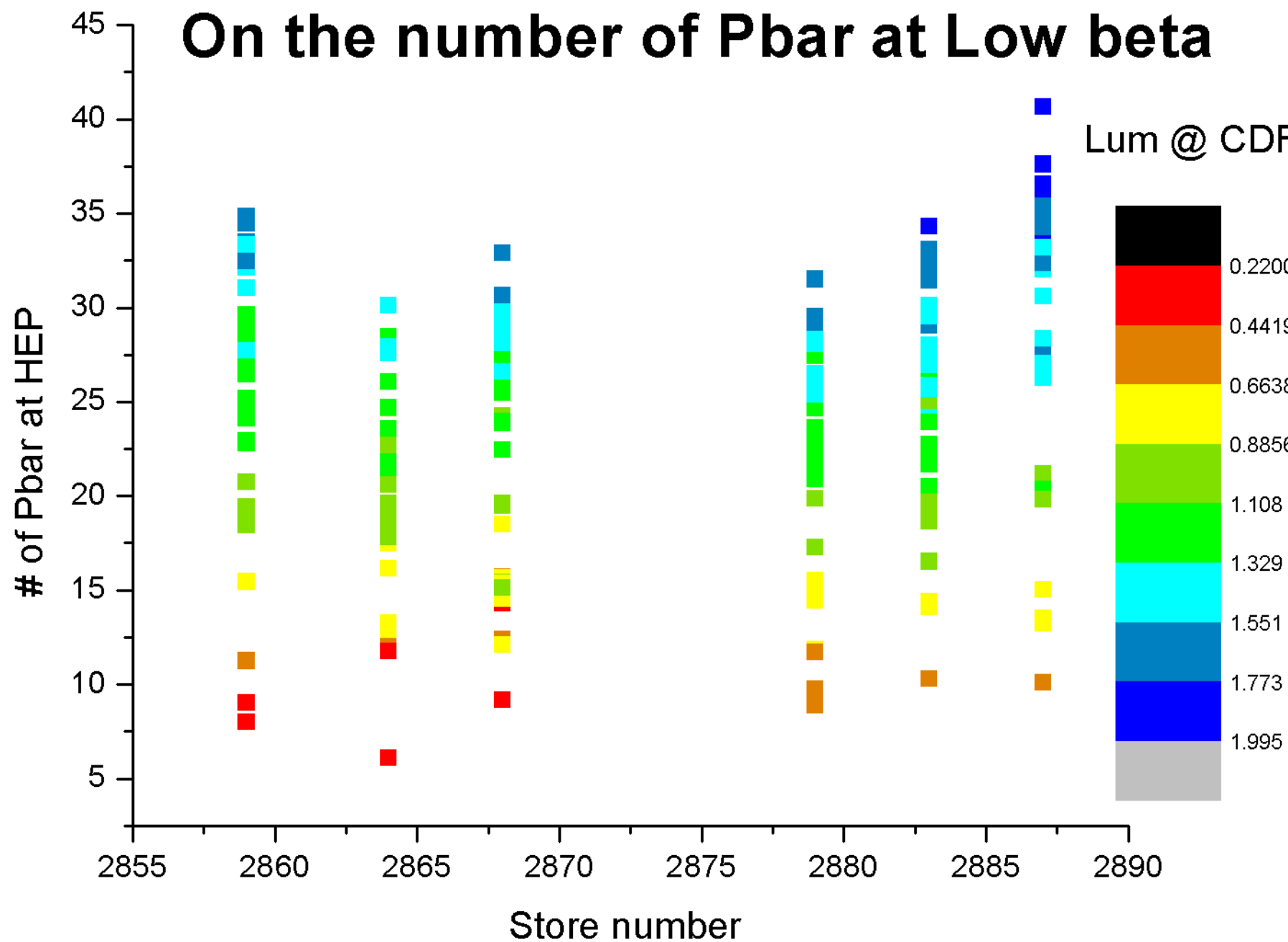
Recent comparison Calculated vs measured luminosity, store 2887



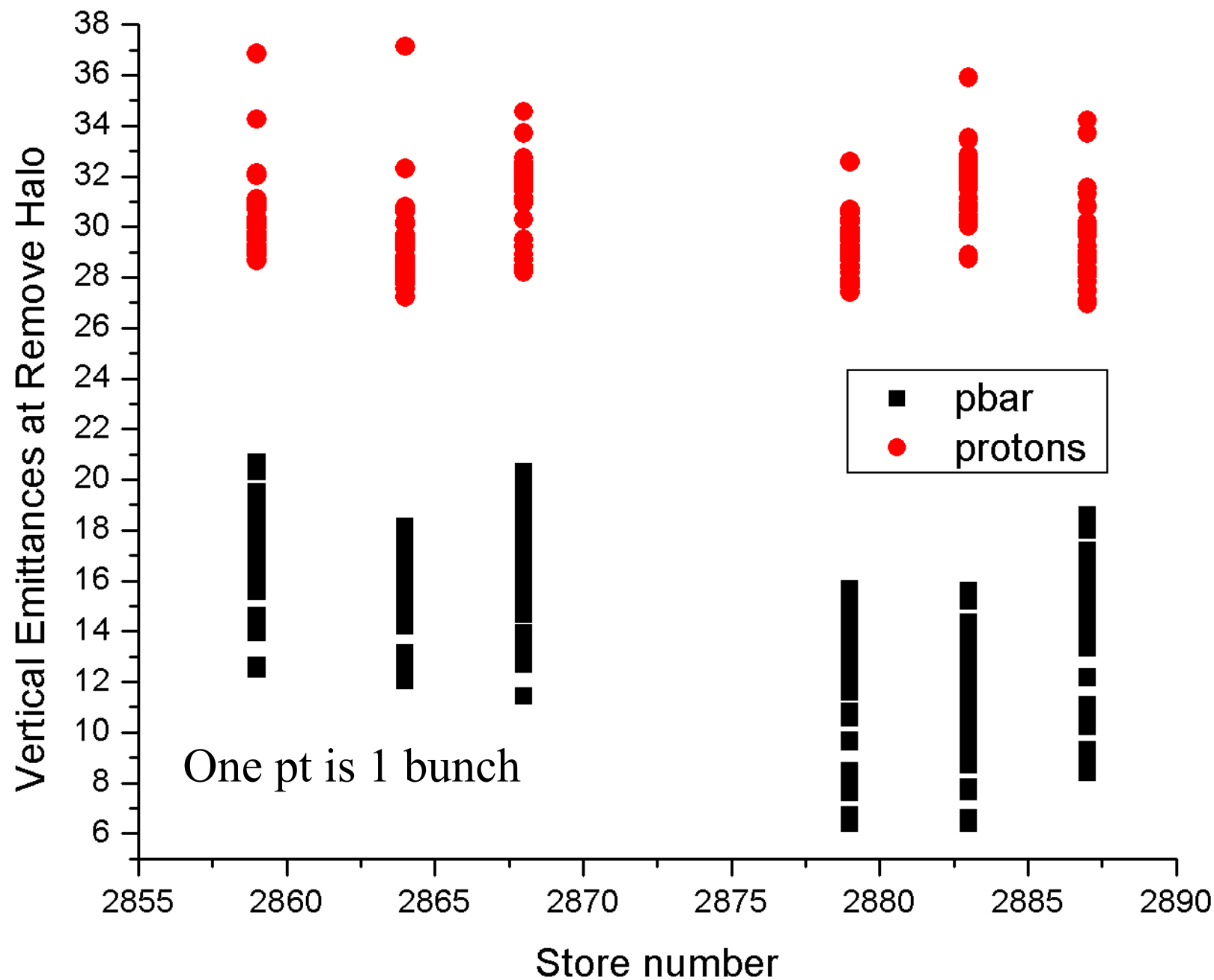
Recent comparison Calculated vs measured luminosity, store 2887



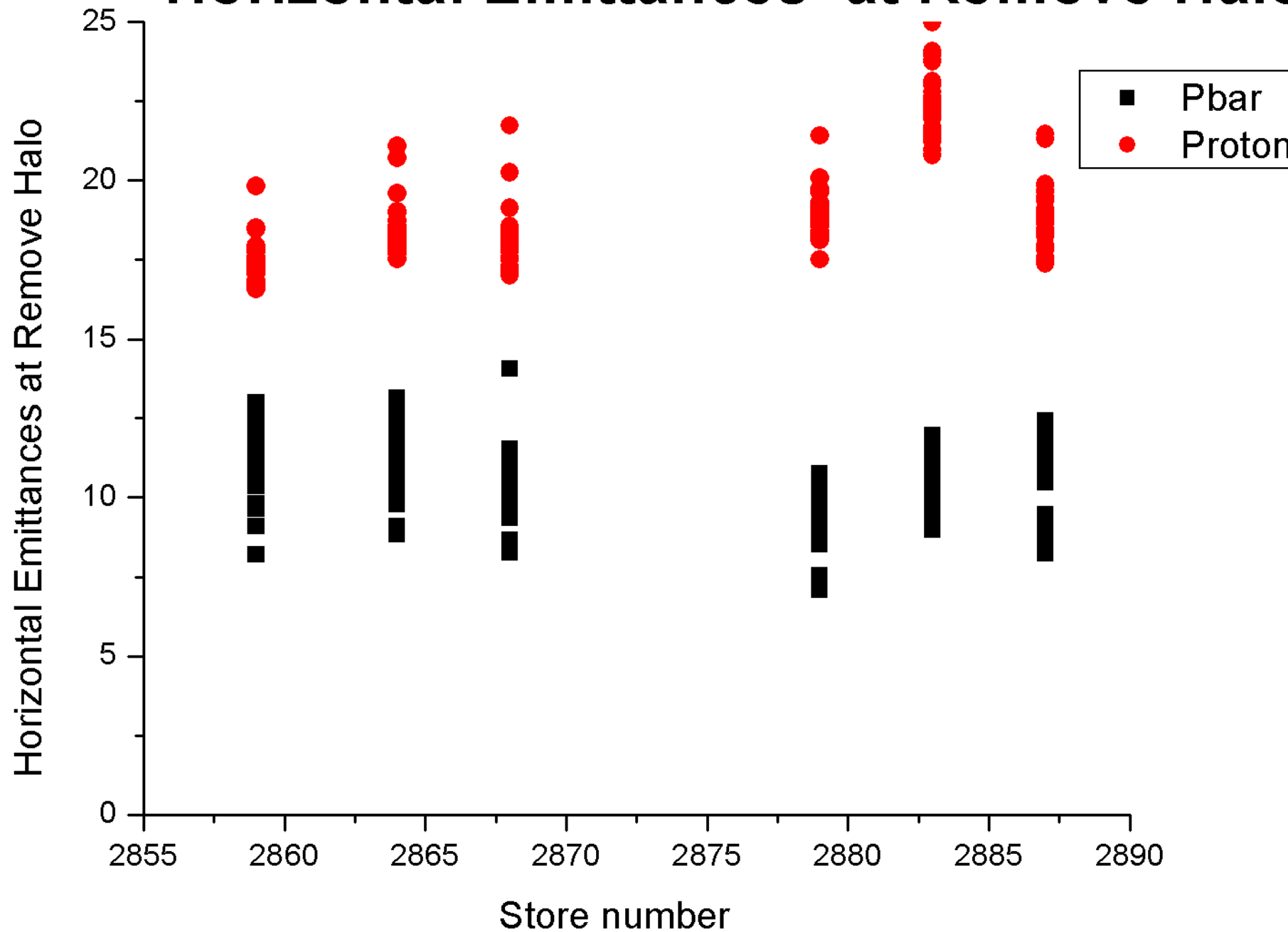
On the number of Pbar at Low beta



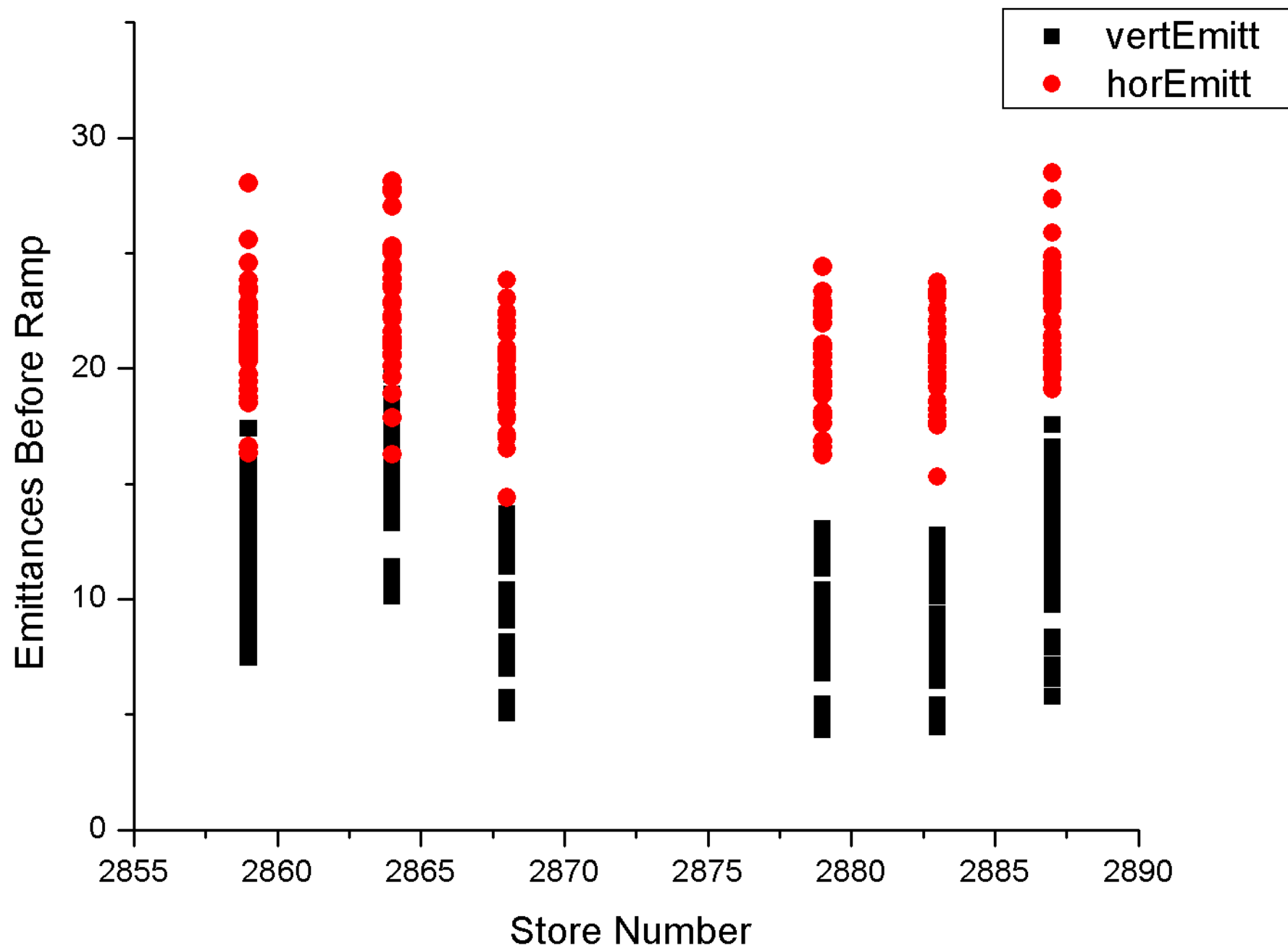
Vertical Emittances at Remove Halo



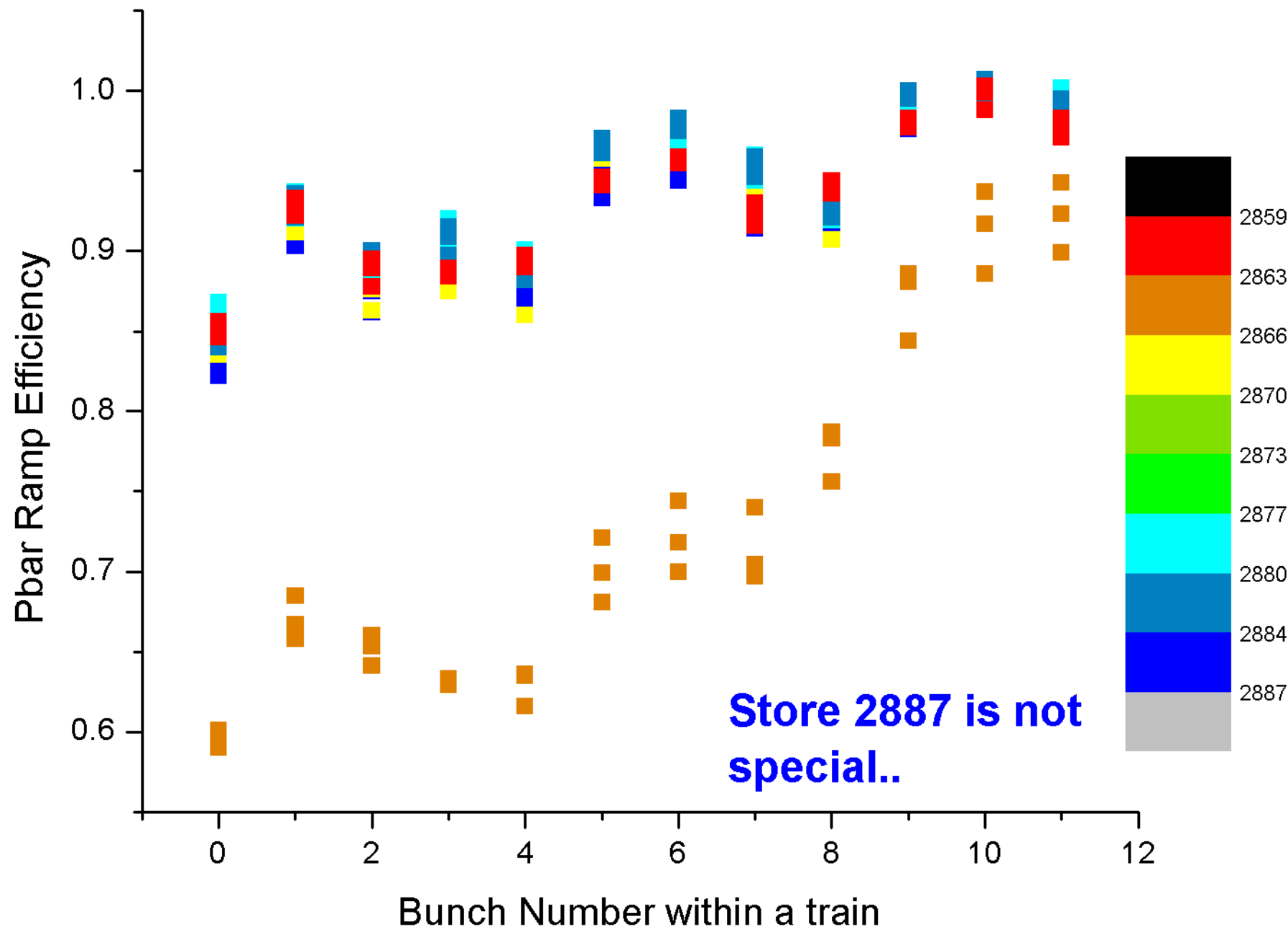
Horizontal Emittances at Remove Halo



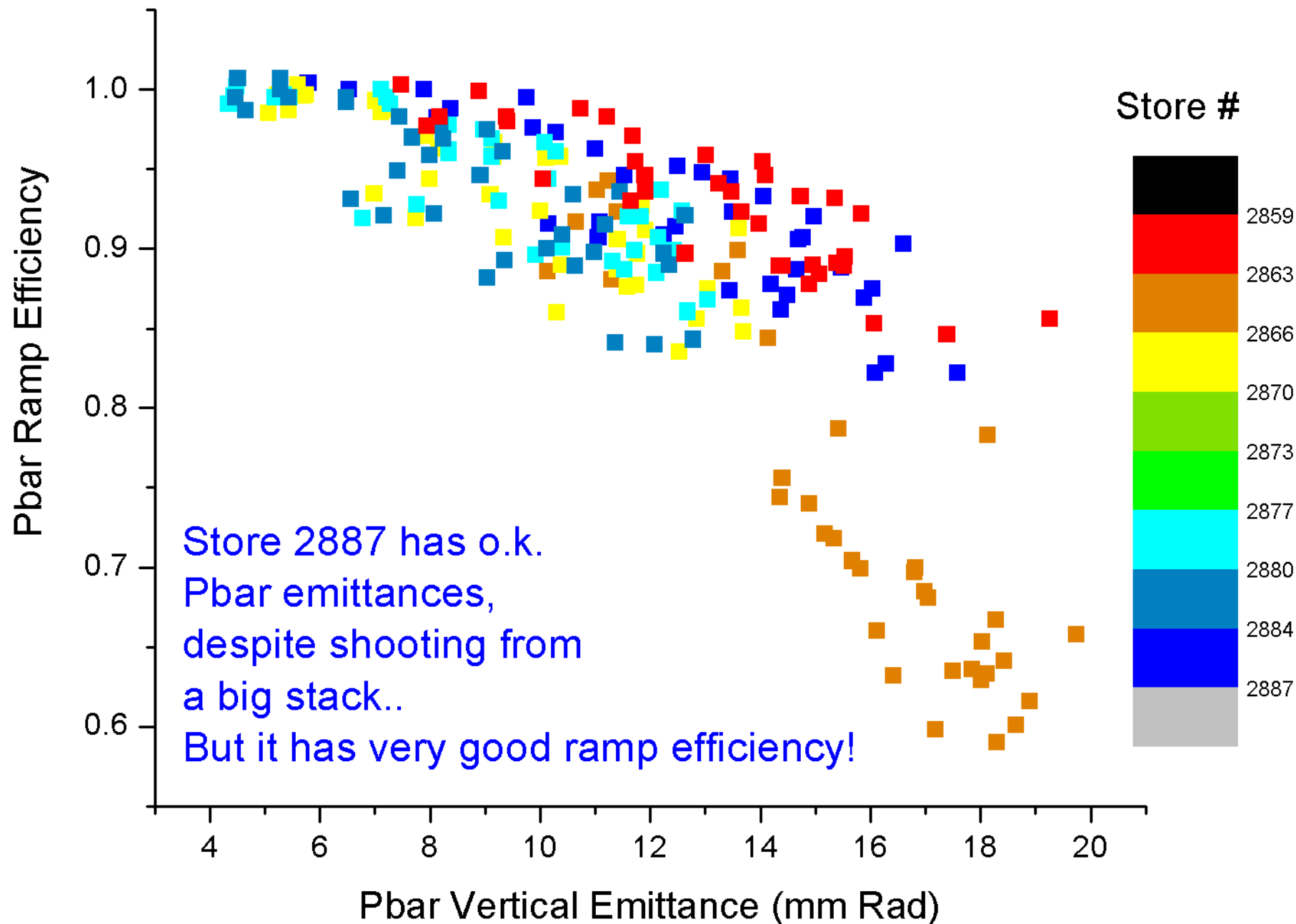
Pbar emittance Before Ramp



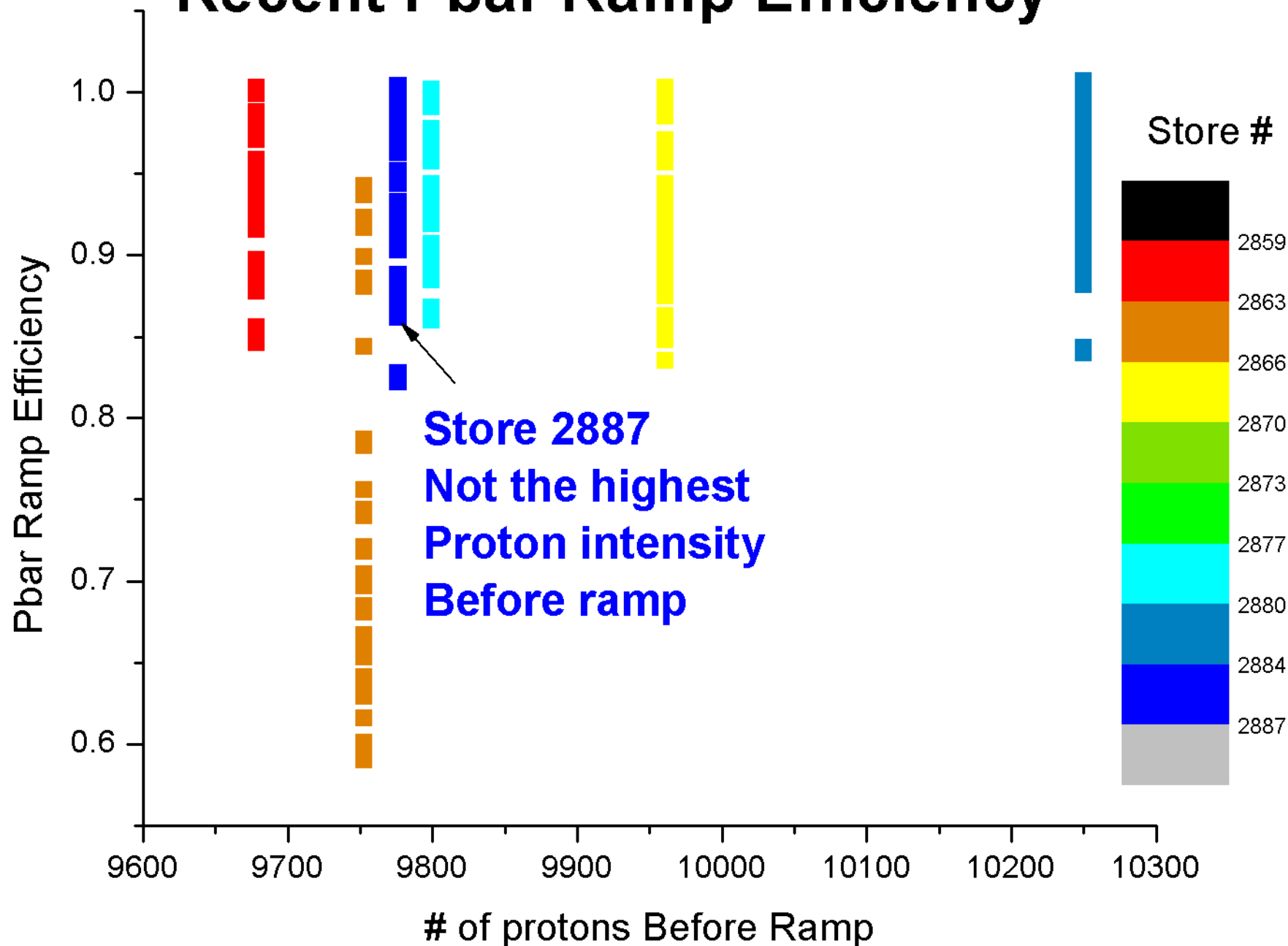
Pbar Ramp Efficiency..



Pbar Ramp Efficiency..



Recent Pbar Ramp Efficiency



Pbar Squeeze Efficiency..

